STAR 0024757

PRE-UNIT MANAGER MEETING
SNP, DOE & USACE

2:00, April 21, 1992
Conference Room 1, SNP Facility

From/Approval: Robert K. Stewart Date: 4/28/92
Robert K. Stewart, 1100-EM-1 Operable Unit Manager (DOE-RL)

Approval: John T. Stewart Date: 28 May 92
John T. Stewart, 1100-EM-1 Operable Unit Proj. Mgr. (USACE)

Approval: SNP refuses to sign minutes Date: RS 6/24/92
Loren Maas, 1100-EM-1 Operable Unit Proj. Mgr. (SNP)

ATTENDEES:

See Attachment 1.

DISCUSSION AND AGREEMENTS:

The U.S. Department of Energy Field Office, Richland (DOE-RL), the U.S. Army Corps of Engineers, Walla Walla District (USACE), and Siemens Nuclear Power Corporation (SNP) met to discuss the status of the Remedial Investigation/Feasibility Study (RI/FS) activities on the 1100-EM-1 Operable Unit and adjoining SNP property. The general Agenda included the following topics:

(1) Circumstances Associated with the 1987 Groundwater Sampling for TCE
(2) EM-24 Group
(3) Results of the PNL Beta Emitter Investigation
(4) Update on General RI/FS Investigations
(5) Groundwater Sampling Schedule
(6) SNP Risk Assessment
(7) Soils Investigation Work Plan
(8) Next Meeting

(1) Circumstances Associated with the 1987 Groundwater Sampling for TCE:

Steve Lockhaven (SNP) provided the following information regarding the 1987 groundwater sampling for TCE and other contaminants:

a) Sampling was initiated by request of a new industrial hygienist (for Exxon) desiring information on volatiles
b) List of contaminants analyzed for was based upon products used at site

TCA	Used in machine shop
TCE	Used for liner installation
Freon	Used in laundry

c) Drums of TCE brought on site one at a time
d) Initial sampling performed in September 1987 focused on wells at N-S boundary and the follow-up sampling event in December 1987 were more centrally located and nearer to the lagoons
e) Sampling and analysis for TCE was not continued in following rounds of sampling because no further action was believed to be warranted
f) The samples in question were not collected using any protocols (for example no decontamination of the sampler was performed)

(2) EM-24 DOE Headquarters Group:

Bob Stewart indicated that EM-24 was performing internal reviews related to remedial alternatives developments and associated costs for the 1100-EM-1 project. He explained that it was not appropriate for SNP to sit in on those meetings, but that information from the meetings would be provided to SNP. Bob indicated that the schedule for the EM-24 group would be consistent with the present project schedule needs. The EM-24 contractor Putnam, Hayes & Bartlett, Inc. will develop a decision tree for use by the project. This decision tree will be available to SNP to the extent that it does not compromise the proprietary nature of the product.

(3) PNL Beta Emitter Investigation:

Bruce Prentice presented the results of the beta emitter investigation being performed by PNL (see Attachment 2). In summary, the results indicate that a plume of Tc-99 extends from SNP to monitoring well FF5-8A. Bruce stated that the beta emitter investigation results show good agreement between the Tc-99 concentrations and total beta. The liquid scintillation, gamma energy analysis, strontium-90, and tritium analysis did not detect other radionuclides (at Horn Rapids Landfill (HRL)) confirms the results of the total beta/Tc-99 analysis which indicates that Tc-99 accounts for most, if not all of the elevated beta activity. Some of the groundwater contamination at SNP (monitoring wells SNP-9 and SNP-15) contain additional radionuclides in addition to the TC-99 as was indicated by the two additional peaks identified in the liquid scintillation results. Additionally, the results for monitoring well S27-E14 indicate this well is located in an entirely different plume as compared with the other wells (probably from the 300 area).

Chuck Malody questioned whether the Tc-99 observed under the HRL was associated with releases for SNP. Any Tc-99 coming onto the SNP facility would have come with the reprocessed uranium. Any releases which included Tc-99 should have contained uranium. Chuck questioned why the uranium is not being detected in the HRL groundwater samples. It was pointed out by Bruce Prentice that differences in the mobility of the Tc-99 and uranium could account for the fact that Tc-99 (which is highly mobile) was observed in HRL groundwater samples and uranium (which is easily bound up in the soil column because of its positively charged state) were not observed in the HRL groundwater samples.

The quantification of Tc-99 by chemical separation (PNL method 7-40.39) was not performed because of problems with the Tc-95 standards. It was proposed by USACE to not perform this analysis for the following reasons:

a) The uncertainty associated with the ICP/MS analysis is relatively minor compared with the Total Beta analysis. Therefore, an additional confirmation of the Tc-99 by a second method will not improve the confidence in the Total Beta.

b) The detection limits for the chemical separation method would not be an improvement over the detection limits provided by the ICP/MS method.

c) Confirmation of the Tc-99 activity counts will be provided by a Tc-99 sparing method performed by K25.

d) Other analyses performed by PNL, such as the Gamma Energy Analysis, Liquid Scintillation, Tritium, and Strontium 90 analysis indicate that there are no other radionuclides that may be contributing to the elevated beta activity. Therefore, there is no reason to suspect the results of the ICP/MS analysis.

e) Good correlation exists for all the data available, and does not suggest a concern about the ICP/MS.

f) The proposed MCL for Tc-99 is 3,790 pCi/l which is substantially greater than the concentrations observed. Even a gross error in the Tc-99 concentration would not affect the risk posed by this contaminant.

g) The cost of the chemical separation does not warrant the need for the data (cost may vary between ($ 10,000 to $ 40,000 for using existing procedures (does not provide for using new procedure with different standard)) considering that it may require 2 - 3 months to complete the work (which would be too late to aid in the investigation).

SNP concurred with canceling with canceling the chemical separation by method 7-40.39.

(4) Update on RI/FS Investigations:

The pump test well has been installed by SNP during the week of April 13, 1992 and testing will begin on Friday, April 24, 1992. Information provided by SNP on their groundwater investigation is shown in Attachment 3. The USACE provided summaries of the vadose zone sampling for the Phase II remedial investigation work and recent up-dates to the groundwater analytical result summary sheets (see Attachment 4).

(5) Groundwater Sampling Schedule:

The groundwater sampling is scheduled for mid May 1992. The groundwater sampling proposed by the USACE is shown on Attachment 5.

(6) SNP Risk Assessment:

The SNP comparison between the Hanford Risk Assessment Methodology and EPA's guidance (and other methodologies) is behind schedule. SNP requested analytical results for the groundwater located between George Washington Way and the Columbia River. This information may be very important in establishing points of compliance.

(7) Soils Investigation Work Plan:

SNP is close to completion of the Soils Investigation Work Plan which will contain significant source information. A presentation of the work plan to DOE is tentatively scheduled for May 8,

1992. USACE noted the importance of the source information to the 1100-EM-1 RI/FS investigation and the need to immediately obtain this information.

(8) Next Meeting:

The next meeting is scheduled for May 26, 1992 at SNP.

ACTION ITEMS:

The action items closed out at this meeting, continuing from previous meetings and new actions for this meeting are shown below:

Actions Items Status List
Pre-Unit Manager Meeting
SNP, DOE & USACE
April 21, 1992

Item No.	Action/Source of Action	Status
PU0392001	Clarify the MCl action levels for gross Beta and Tc-99. Action: W. Greenwald (03/24/92).	Closed. Copies of proposed standard provide 03/25/92.
PU0392002	Review DOE beta analysis data, and evaluate the need for additional radio-isotope analysis on the new SNP groundwater wells. Action: S. Keith (03/24/92).	Open.
PU0392003	Provide well logs and coordinates of 300-FF-5-7A and -8A groundwater monitoring wells to SNP. Action: W. Greenwald (03/24/92).	Closed. See Attachment 6 for data provided to SNP.
PU0392004	Provide well pump test data from 300 Area to SNP. Action: W. Greenwald (03/24/92).	Open.
PU0392005	Evaluate the appropriateness of SNP involvement with the DOE-HQ, EM-24 group. Action: B. Stewart (03/24/92).	Closed.

Actions Items Status List
Pre-Unit Manager Meeting
SNP, DOE, USACE
April 21, 1992

Item No.	Action/Source of Action	Status
PU039006	SNP risk assessors will compare and evaluate the Hanford Site Baseline Risk Assessment Methodology, EPA Region X risk assessment guidance, EPA response to USACE risk assessment questions, and the EPA residential risk assessment for the 1100-EM-1 Operable Unit, and provide their results to DOE-RL. Action: S. Keith (03/24/92).	Open.
PU0392007	Provide 300 Area groundwater elevations to SNP. Action: W. Greenwald (03/24/92).	Closed. See Attachment 6 for data provided to SNP.
PU0392008	USACE will investigate (and, if possible, provide) why November 1991 groundwater levels are not listed for MW-19, MW-20, MW-21 and MW-22. Action: W. Greenwald (03/24/92).	Closed. Data is not available.
PU0392009	SNP will provide DOE-RL/USACE the single page Lagoon History Report.	Closed. Provided to Greenwald on 3/25/92.
PU0392010	SNP will review data requests from DOE-RL/USACE, and provide available data that may be released. Action: S. Keith (03/24/92).	Open.
PU0492001	USACE will develop a list of source information which will be requested of SNP. Action J. Stewart (04/21/92).	Open.

Actions Items Status List
Pre-Unit Manager Meeting
SNP, DOE, USACE
April 21, 1992

Item No.	Action/Source of Action	Status
PU0492002	USACE will provide SNP with water quality data, if available, for the area between George Washington Way and the Columbia River. Action W. Greenwald (04/21/92).	Open.
PU0492003	USACE will provide SNP with current maps of 1100-EM-1 monitoring wells. Action: J. Anderson (04/21/92).	Open.
PU0492004	USACE will mail a detailed copy of the PNL results to Jay Bower. Action: W. Greenwald (04/21/92).	Open.

Pre-Unit Managers Meeting Attendance			
Date 4/21/92	Place Conference Room 1 - Siemens		
Purpose Discuss Unit Managers Meeting			
Name Last - First	Representing	Title	Phone
Francis, Clive	SNP	Staff Eng.	375-8252
Foote, Alden	USACE	Env. Engr	522-6870
Wendell Greenwald	USACE	Tech Mgr	376-1252
MAAS, LOREN	SNP	MGR - REG COMP	375-8537
Malody, Chuck	SNP	consultant	375-8537
Prentice, Bruce	PNL	Proj. Mgr.	376-6193
Stewart, Bob	DOE-RL	1100EM1 U. Mgr	376-6192
Anderson John	ACE	Hydrogeol.	509-527-1231
Munor, Doris	for SNP	Engineer	206-633-2308
Bower, Jay	G&M	Environ. Engr.	206 869-6321
Susan Keith	G&M for SNP	Manager	206 869-6321

9-1-92-171

1100-EM-1 Groundwater Characterization Phase 1

Data Package / Report No. 1
Revision 0

B. A. Prentice
S. K. Fadeff
J. H. Kaye
E. A. Lepel
N. L. Wynhoff
E. J. Wyse

April 1992

Pacific Northwest Laboratory

ATTACHMENT 2

Total Beta and Tc-99 Results

Plume Samples (MW-10, MW-11, MW-12, MW-13, MW-14, MW-15):

- Total beta concentration, determined as Tc-99, ranges from 75.3 to 138 pCi/L. Tc-99 concentration ranges from 84 to 149 pCi/L.

- Mean difference between total beta and Tc-99 is -11.6 pCi/L.

Up-Gradient Samples (MW-8, MW-9):

- Detectable, but relatively low, total beta and Tc-99.

Samples from Other Wells:

- The following wells exhibited total beta and Tc-99 concentrations similar to plume samples: MW-20, FF5-8A, SNP-9, and SNP-15.

- The following wells exhibited total beta and Tc-99 concentrations similar to up-gradient samples: MW-19, MW-21, MW-22, FF5-7A, and SNP-24.

- The sample from S27-E14 does not resemble plume or up-gradient well samples in total beta and Tc-99 concentrations.

Total Beta and Tc-99 Results (pCi/L)

ACL No.	ID	Well	Beta	Tc-99	Beta-Tc
92-2724	B01572	MW-8	10.8	17	6.2
92-2725	B01573	MW-9	5.72	15	-9.28
92-2726	B01574	FF5-7A	11.4	24	-12.6
92-2727	B01575	FF5-8A	85.2	121	-35.8
92-2728	B015S9	MW-10	90.1	125	-34.9
92-2729	B015T1	MW-11	123	128	-5
92-2730	B015T3	MW-12	107	149	-42
92-2731	B015T5	MW-13	75.3	118	-42.7
92-2732	B015T7	MW-14	100	139	-39
92-2733	B015T9	MW-15	78.2	84	-5.8
92-2734	B015V1	SNP-9	105	115	-10
92-2735	B015V3	SNP-15	153	141	12
92-2736	B015V5	SNP-24	4	< 10	
92-2737	B015V7	MW-19	11.7	< 10	
92-2738	B015V8	MW-20	139	155.5	-16.5
92-2739	B015V9	MW-21	8.87	< 10	
92-2740	B015W0	MW-21D	10.2	< 10	
92-2741	B015W1	MW-21S	8.65	< 10	
92-2742	B015W2	MW-22	17.8	< 10	
92-2743	B015W3	TBLK	< 3	< 10	
92-2744	B01BV6	MW-10	108	135	-27
92-2745	B01BV9	MW-11	115	140	-25
92-2746	B01BW2	MW-12	138	121	17
92-2747	B01BW5	MW-13	102	104	-2
92-2748	B01BW8	MW-14	128	99	29
92-2749	B01BX1	MW-15	76.1	86	-9.9
92-2750	B01C38	MW-10DUP	122	86	36
92-2751	B01C11	MW-19	14.1	17	-2.9
92-2752	B01C28	S27-E14	33.9	20	13.9

Summary for Plume Samples (pCi/L)

(MW-10, MW-11, MW-12, MW-13, MW-14, MW-15)

	Beta	Tc-99	Beta-Tc
Average	104.82	116.46	-11.6
Standard Deviation	20.48	22.48	26.6
N	13	13	13
SEM	5.7	6.2	7.4
CV	0.20	0.19	-2.29
Maximum	138	149	36.0
Minimum	75.3	84	-42.7

Total Beta and Tc-99 Results (pCi/L)

ACL No.	ID	Well	Beta	Tc-99	Beta-Tc
92-2724	B01572	MW-8	10.8	17	6.2
92-2725	B01573	MW-9	5.72	15	-9.28
92-2726	B01574	FF5-7A	11.4	24	-12.6
92-2727	B01575	FF5-8A	85.2	121	-35.8
92-2728	B015S9	MW-10	90.1	125	-34.9
92-2729	B015T1	MW-11	123	128	-5
92-2730	B015T3	MW-12	107	149	-42
92-2731	B015T5	MW-13	75.3	118	-42.7
92-2732	B015T7	MW-14	100	139	-39
92-2733	B015T9	MW-15	78.2	84	-5.8
92-2734	B015V1	SNP-9	105	115	-10
92-2735	B015V3	SNP-15	153	141	12
92-2736	B015V5	SNP-24	4	< 10	
92-2737	B015V7	MW-19	11.7	< 10	
92-2738	B015V8	MW-20	139	155.5	-16.5
92-2739	B015V9	MW-21	8.87	< 10	
92-2740	B015W0	MW-21D	10.2	< 10	
92-2741	B015W1	MW-21S	8.65	< 10	
92-2742	B015W2	MW-22	17.8	< 10	
92-2743	B015W3	TBLK	< 3	< 10	
92-2744	B01BV6	MW-10	108	135	-27
92-2745	B01BV9	MW-11	115	140	-25
92-2746	B01BW2	MW-12	138	121	17
92-2747	B01BW5	MW-13	102	104	-2
92-2748	B01BW8	MW-14	128	99	29
92-2749	B01BX1	MW-15	76.1	86	-9.9
92-2750	B01C38	MW-10DUP	122	86	36
92-2751	B01C11	MW-19	14.1	17	-2.9
92-2752	B01C28	S27-E14	33.9	20	13.9

Results of Other Methods

Liquid Scintillation Analysis

- Beta energy spectra of plume samples exhibit single peak, coincident with theoretical Tc-99 peak.

- Spectra from SNP-9 and SNP-15 show peak coincident with Tc-99, plus one or two additional peaks.

- Sample from S27-E14 exhibits broad beta spectrum with no definitive peaks, though signal in Tc-99 region is above background.

Gamma Energy Analysis (GEA)

- No detectable gamma peaks.

Sr-90 Analysis

- No detectable Sr-90.

Tritium Analysis

- Most results below detection limit of 450 pCi/L. Well MW-13 -- one sample above DL, the other below. Well MW-10 -- one sample at DL, others below.

Tc-99 by Procedure 7-40.39

- Could not be completed due to difficulties associated with the Tc-95m standard used for recovery corrections.

Summary

- In plume samples, mean total beta concentration, determined as Tc-99, is 105 (+/- 20 s.d.) pCi/L.

- Tc-99 appears to account for most, if not all, beta activity in plume samples; there is no data to suggest any other contributor to beta concentration.

TABLE 2. SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES
SIEMENS NUCLEAR POWER CORPORATION
RICHLAND, WASHINGTON

SAMPLE ID	DATE SAMPLED	DEPTH (ft bls)	VOA TCE (mg/kg)	VOA ACETONE (mg/kg)	AMMONIA as N (mg/kg)	FLUORIDE (mg/kg)	NITRATE as N (mg/kg)	NITRITE as N (mg/kg)	GROSS ALPHA RADIATION (pCi/g)	GROSS BETA RADIATION (pCi/g)
GM-12, S-2	16-Oct-91	20.0 - 20.5	1 U	NA	NA	NA	NA	NA	NA	NA
GM-3	29-Oct-91	Barrel Composite	6 U	14 B	20.5 U	1.11	1.20 UJ	1.20 UJ	1.8 +/- 4.0	9.2 +/- 3.5
GM-5	29-Oct-91	Barrel Composite	NA	NA	39.0	40.6	4.55 J	1.20 UJ	NA	NA

VOA	Volatile Organic Analytes
TCE	Trichloroethene
ft bls	Feet below land surface
mg/kg	Milligrams per kilogram
pCi/g	Picocuries per gram
B	Compound detected in blank
J	Estimated value
U	Not detected at given detection limit
NA	Not Applicable
N	Nitrogen

Analytical methods:

Ammonia	USEPA Method 350.2
Fluoride	USEPA Method 340.2
Gross Alpha Radiation	USEPA Method 900.0
Gross Beta Radiation	USEPA Method 900.0
Nitrate/Nitrite	USEPA Method 300.0
VOA	USEPA Method 8240

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ATTACHMENT 3

SIEMENS WATER-LEVEL DATA

DATE OF MEASUREME	16-Dec-91	16-Dec-91	13-Jan-92	13-Jan-92	12-Feb-92
WELL NUMBER	DEPTH TO WATER (ft btopc)	WATER-LEVEL ELEVATION (ft msl)	DEPTH TO WATER (ft btopc)	WATER-LEVEL ELEVATION (ft msl)	DEPTH TO WATER (ft btopc)
GM-1	20.10	355.34	20.24	355.20	20.44
GM-2	14.76	355.35	14.87	355.24	15.03
GM-3	15.69	355.19	15.80	355.08	15.94
GM-4	14.70	354.97	14.79	354.88	14.94
GM-5	12.50	354.89	12.59	354.80	12.74
GM-6	25.95	354.92	26.05	354.82	26.21
GM-7	26.11	354.78	26.20	354.69	26.34
GM-8	17.75	354.73	17.84	354.64	17.98
GM-9	16.43	354.61	16.50	354.54	16.62
GM-10	21.76	354.57	21.84	354.49	21.96
GM-11	27.50	354.34	27.57	354.27	27.70
GM-12	34.77	354.01	34.86	353.92	35.00
TW-1	11.98	355.02	12.06	354.94	12.22
TW-2	14.98	355.02	15.08	354.92	15.23
TW-3	14.41	355.11	14.51	355.01	14.67
TW-4	15.89	355.15	16.00	355.04	16.17
TW-5	15.96	355.17	16.06	355.07	16.24
TW-6	10.93	355.22	11.04	355.11	11.22
TW-7	11.88	355.27	12.01	355.14	12.17
TW-8	17.27	355.17	17.36	355.08	17.51
TW-9	12.87	354.97	12.94	354.90	13.10
TW-11	17.86	355.26	17.97	355.15	18.16
TW-12	18.88	355.27	19.00	355.15	19.18
TW-13	19.72	355.35	19.86	355.21	20.04
TW-14	15.45	354.59	15.50	354.54	15.64
TW-15	15.85	354.59	15.93	354.51	16.06
TW-16	22.00	354.77	22.06	354.71	22.19
TW-17	24.76	354.7	24.83	354.7	24.96
TW-18	22.70	354.6	22.76	354.5	22.89
TW-19	26.09	355.06	26.19	354.96	26.34
TW-20	26.32	355.11	26.40	355.03	26.57
TW-21	25.25	355.22	25.36	355.11	25.54
TW-22	19.71	355.24	19.85	355.10	20.04
TW-23	17.84	355.41	17.96	355.29	18.12
TW-24	18.05	355.31	18.15	355.21	18.31
TW-25	16.54	355.38	16.63	355.29	16.76
TW-26	12.71	354.99	12.79	354.91	12.93

SIEMENS WATER-LEVEL DATA

DATE OF MEASUREME	12-Feb-92	9-Mar-92	9-Mar-92
WELL NUMBER	WATER-LEVEL ELEVATION (ft msl)	DEPTH TO WATER (ft btopc)	WATER-LEVEL ELEVATION (ft msl)
GM-1	355.00	20.61	354.83
GM-2	355.08	15.18	354.93
GM-3	354.94	16.09	354.79
GM-4	354.73	15.08	354.59
GM-5	354.65	12.88	354.51
GM-6	354.66	26.35	354.52
GM-7	354.55	26.47	354.42
GM-8	354.50	18.10	354.38
GM-9	354.42	16.74	354.30
GM-10	354.37	22.08	354.25
GM-11	354.14	27.82	354.02
GM-12	353.78	35.10	353.68
TW-1	354.78	12.35	354.65
TW-2	354.77	15.37	354.63
TW-3	354.85	14.82	354.70
TW-4	354.87	16.32	354.72
TW-5	354.89	16.39	354.74
TW-6	354.93	11.38	354.77
TW-7	354.98	12.36	354.79
TW-8	354.93	17.65	354.79
TW-9	354.74	13.24	354.60
TW-11	354.96	18.32	354.80
TW-12	354.97	19.34	354.81
TW-13	355.03	20.24	354.83
TW-14	354.40	15.76	354.28
TW-15	354.38	16.17	354.27
TW-16	354.58	23.01	353.76
TW-17	354.5	25.09	354.4
TW-18	354.4	23.02	354.3
TW-19	354.81	26.49	354.66
TW-20	354.86	26.72	354.71
TW-21	354.93	25.74	354.73
TW-22	354.91	20.22	354.73
TW-23	355.13	18.27	354.98
TW-24	355.05	18.46	354.90
TW-25	355.16	16.90	355.02
TW-26	354.77	13.07	354.63

COMPARISON OF PHASE II VADOSE SAMPLE RESULTS WITH PHASE I RI PRELIMINARY SCREENING

CONTAMINANT	MAX. CONCENTRATION OBSERVED IN PHASE II VADOSE SAMPLES AT EPHEMERAL POOL	MAX. CONCENTRATION OBSERVED IN PHASE II VADOSE SAMPLES AT HRL	CONCENTRATION USED IN PHASE I PRELIMINARY SCREENING
Beta-BHC		94 ppb	
Dieldrin		1200 ppb	
Endrin		280 ppb	23000 ppb
Endosulfan II		110 ppb	3800 ppb
4,4', DDE		98 ppb	124 (observed) 2100 (prelim scr)
4,4', DDT		520 ppb	
Methoxychlor		140 ppb	
Endrin Ketone		140 ppb	
Alpha Chlordane	1100 ppb	780 ppb	1860 (observed) 530 (prelim scr)
Gamma Chlorodane	1700 ppb	21 ppb	
Aroclor 1248		59000 ppb	65290 (observed) 90 (prelim scr)
Aroclor 1254		2000 ppb	
Aroclor 1260	42000 ppb	----	
Aluminum		17800 ppm	24000 ppm
Antimony		15.6 ppm	31 ppm
Barium		511 ppm	3800 ppm
Beryllium		1.1 ppm	22 ppm
Cadmium		2.4 ppm	30 ppm
Calcium		46600 ppm	------
Chromium		133 ppm	1250 (observed) 4.4 (prelim scr)
Cobalt		18.9 ppm	
Copper		1280 ppm	
Iron		32700 ppm	------
Lead		854 ppm	482 (observed)
Magnesium		7640 ppm	

Manganese		501 ppm	15000 ppm
Mercury		0.15	23 ppm
Nickel		81.8 ppm	220 ppm
Potassium		3820 ppm	
Selenium		0.97 ppm	230 ppm
Sodium		2360 ppm	------
Titanium		3180 ppm	
Vanadium		84.9 ppm	540 ppm
Zirconium		28.6 ppm	
Zinc		3160 ppm	15000 ppm
2-Hexanone		25 ppb	same as 2-Butanone
Toluene		9 ppb	
2-Butanone		35 ppb	4000000 ppb
BEHP		1.1 ppm	25046 (observed) 50 (prelim scr)

Note:

Contaminants having concentrations below background are not shown.

DRAFT

RADIOCHEMICAL ANALYSES OF GROUND WATER MONITORING WELL SAMPLES

Temp. Well Number	Gross Beta, pCi/l								
	1st	2nd	3rd	4th	5th	6th	7th	7-1/2	8
	2/90	5/90	8/90	11/90	3/91	6/91	8/91	9/91	11/91
MW-1	12.7	-	12.1	9.2		8.6			
MW-2	8.2	-	9.3	11.9		13			
MW-3	14.7	7.9	12.5	15.0		11			
MW-4	-		10.6	-		6.9			
MW-5	-	-	-	8.9		7.4			
MW-6	-	-	-	10.4		8.1			
MW-7	6.1	-	7.9	9.1		9.5			
MW-8	-	-	9.4	-				7.6	
MW-9	-	-	7.6	-		5.0		6.9	
MW-10	30.2	85.2	95.4	88.9	63.0	62	18	43	
MW-11	35.2	86.5	74.7	81.0	60.0	61	20	49	
MW-12	34.6	87.6	91.0	77.6	61.0	66		53	
MW-13	28.8	71.0	81.2	85.8	61.0	60		48	
MW-14	25.1	89.4	90.8	89.0	70.0	61		46	
MW-15	23.2	51.4	63.6	57.6	46.0	50		41	
MW-17		-	-	8.1		6.2			
MW-18					13.0	9.7	5.5		
MW-19							9.2	9.5	
MW-20							71	53	
MW-21							7.3	8.6	
MW-22							10	9.3	
S27-E14		19.7	31.5	14.9		33			
S29-E12		-	10.5	-		12			
S30-E15A		-	-	-		9.8			
S31-E13		-	-	-		11			
S32-E13A		-	11.0	7.9		5.3			
S37-E14	-	-	-	-	-	4.1	2.4		
S40-E14	-		-	-	-	-	2.2		
S41-E13A	-	-	-	-	12.0	5.2	3.9		
S41-E13B	-	9.4	11.2	-	12.0	8.9	7.6		
S43-E12	8.8	8.3	10.5	13.8	8.8	13	9.3		
SNP # 9								68	
SNP # 14		6.5	58.9					51	
SNP # 15		126.7	98.4					80	
SNP # 16		58.4	19.1					42	
SNP # 23								6.9	
SNP # 24								4.8	
RWF East	-	-	8.1	-		-			
RWF West	-	-	-	-	-	-			
FF5-7A						15		6.0	
FF5-8A						65	4.6	44	

- = Below upper tolerance limit (for rounds 1-4)
- = Below error limit (for round 5)

Values for rounds 1-4 from Data Validation Report, Fourth Quarter Groundwater Chemical Analysis, 1100-EM-1 Operable Unit, Phase I Remedial Investigation

Radionuclide Maximum Contaminant Levels (MCL), 40 CFR 141, EPA 1986a:
Gross Beta . . . . 50 pCi/l

DRAFT

1100-EM-1 Operable Unit

DRAFT

ANALYSES OF VOLATILE ORGANIC COMPOUNDS IN GROUND WATER SAMPLES

Well Number	Analysis, parts per billion (ppb) TCE								
	1st 2/90	2nd 5/90	3rd 8/90	4th 11/90	5th 3/91	6th 6/91	7th 8/91	7-1/2 9/91	8th 11/
MW-1	-	-	-	-		-			
MW-2	-	-	-	-		-			
MW-3	-	-	-	-		-			-
MW-4	-	-	-	-		-			-
MW-5	-	-	-	-		-			-
MW-6	-	-	-	-		-			-
MW-7	-	-	-	-		-		-	
MW-8	-	-	-	-		-		-	
MW-9	-	-	-	-		-		-	
MW-10	0.6J	2	2	-	-	2J	3J	-	3J
MW-11	0.9J	3	2	3	4J	3J	3J	4J	4J
MW-12	92	110	80	74	79	78	69	67	69
MW-13	90	91	81	69	68	70	69	66	63
MW-14	40	73	60	66	82	75	75	76	67
MW-15	84	80	82	59	60	62	70	66	64
MW-17	-	-	-	-		-			
MW-18					-	-			
MW-19						-	-	-	-
MW-20						3J	2J	3J	4J
MW-21						-	-	-	
MW-22						-	-	-	
S27-E14		0.9J	0.9J	1J		-			
S29-E12		-	-	-		-			
S30-E15A		-	-	-		-			
S31-E13		-	-	-		-			
S32-E13A		-	-	-		-			
S37-E14	-	-	-	-	-	-	-		
S40-E14	-	-	-	-	-	-	-		
S41-E13A	-	-	-	-	-	-	-		-
S41-E13B	-	-	-		-	-	-		-
S43-E12	-	-	-	-	-	-	-		-
RWF East	-	-	-	-	-	-	-		
RWF West	-	-	-		-	-	-		
SNP # 14		22						17	
SNP # 15		58						30	
SNP # 16		53						32	
SNP # 23								-	
SNP # 24								-	
SNP # 9								13	
W-7A							-	-	
W-8A								-	

SNP

53 (74

- = Not detected
J = Estimated Value

Values for rounds 1-4 from Data Validation Report, Fourth Quarter Groundwater Chemical Analysis, 1100-EM-1 Operable Unit, Phase I Remedial Investigation

Values for rounds 6-8 are derived from "Unvalidated" Data Packages

TCE: Trichloroethene - Drinking Water MCL, 5ppb

DRAFT

ANALYSES OF VOLATILE ORGANIC COMPOUNDS IN GROUND WATER SAMPLES

Well Number	Analysis, parts per billion (ppb) PCE								
	1st 2/90	2nd 5/90	3rd 8/90	4th 11/90	5th 3/91	6th 6/91	7th 8/91	7-1/2 9/91	8th 11/91
MW-1	-	-	-	-		-			
MW-2	-	-	-	-		-			
MW-3	-	-	-	-		-			-
MW-4	1.J	1	0.9J	-		-			-
MW-5	0.8J	0.8J	0.8J	-		-			
MW-6	0.7J	0.8J	1	-		2 J			-
MW-7	-	-	-	-		-		-	
MW-8	-	-	-	-		-		-	
MW-9	-	-	-	-		-		-	
MW-10	-	-	-	-	-	-	0.9 J	-	-
MW-11	-	-	-	-	-	-	-	-	-
MW-12	-	-	-	-	-	-	-	-	-
MW-13	-	-	-	-	-	-	-	-	-
MW-14	-	-	-	-	-	-	-	-	-
MW-15	-	-	-	-	-	-	-	-	-
MW-17	-	-	-	-		-			
MW-18					2 J	-	-		4 J
MW-19						-	-	-	-
MW-20						-	-	-	-
MW-21						-	-	-	-
MW-22						-		-	
S27-E14		-	-	-		-			
S29-E12		-	-	-		-			
S30-E15A		-	-	-		-			
S31-E13		-	-	-		-			
S32-E13A		-	-	-		-			
S37-E14	-	-	-	-	-	-	-		
S40-E14	-	-	-	-	-	-	-		
S41-E13A	-	-	-	-	-	-	-		-
S41-E13B	-	-	-		-	-	-		-
S43-E12	-	-	-	-	-	-	-		-
RWF East	-	-	-	-	-	-	-		-
RWF West	-	-	-		-	-	-		-
SNP # 14		-						-	
SNP # 15		-						-	
SNP # 16		-						-	
SNP # 23								-	
SNP # 24								-	
SNP # 9									
W-7A								-	
W-8A								-	

-: Not detected
J: Estimated Value

Values for rounds 1-4 from Data Validation Report, Fourth Quarter Groundwater Chemical Analysis, 1100-EM-1 Operable Unit, Phase I Remedial Investigation

Values for rounds 6-8 are derived from "Unvalidated" Data Packages

PCE: Tetrachloroethene - Drinking Water MCL, 5ppb

DRAFT

ANALYSES OF VOLATILE ORGANIC COMPOUNDS IN GROUND WATER SAMPLES

Well Number	Analysis, parts per billion (ppb) TCA								
	1st 2/90	2nd 5/90	3rd 8/90	4th 11/90	5th 3/91	6th 6/91	7th 8/91	7-1/2 9/91	8th 11/91
MW-1	-	-	-	-		-			
MW-2	-	-	-	-		-			
MW-3	-	-	-	-		-			-
MW-4	3.J	2	2	2.J		-			-
MW-5	4.J	4	3	3.J		3 J			3 J
MW-6	2.J	0.9J	2	-		-			
MW-7	-	-	-	-		-			
MW-8	0.8J	0.8J	0.8J	-		-		-	
MW-9	-	-	-	-		-		-	
MW-10	1	1	1	-	-	2 J	1 J	1 J	-
MW-11	0.8J	1	1	1.J	-	-	1 J	1 J	-
MW-12	-	-	2	2.J	-	3 J	2 J	2 J	-
MW-13	-	-	2	1.J	-	-	-	2 J	-
MW-14	-	-	1	-	-	-	-	2 J	-
MW-15	-	-	2	1.J	-	-	-	1 J	-
MW-17	-	-	-	-		-			
MW-18					-	-			
MW-19						-	-	-	-
MW-20						-	-	-	-
MW-21						-	-	-	-
MW-22						-	-	-	
S27-E14		-	-	-		-			
S29-E12		-	-	-		-			-
S30-E15A		-	-	-		-			
S31-E13		-	-	-		-			
S32-E13A		-	-	-		-			
S37-E14	-	-	-	-	-	-	-		
S40-E14	-	-	-	-	-	-	-		
S41-E13A	-	-	-	-	-	-	-		-
S41-E13B	-	-	-		-	-	-		-
S43-E12	-	-	-	-	-	-	-		-
RWF East	-	-	-	-	-	-	-		-
RWF West	-	-	-		-	-	-		
SNP # 14		7						5	
SNP # 15		5						3 J	
SNP # 16		-						-	
SNP # 23								-	
SNP # 24								-	
SNP # 9								2 J	
W-7A							-	-	
W-8A								-	

-: Not detected
J: Estimated Value

Values for rounds 1-4 from Data Validation Report, Fourth Quarter Groundwater Chemical Analysis, 1100-EM-1 Operable Unit, Phase I Remedial Investigation

Values for rounds 6-8 are derived from "Unvalidated" Data Packages

TCA: 1,1,1-Trichloroethane - Drinking Water MCL, 200 ppb

1100-EM-1 Operable Unit

DRAFT

ANALYSES OF INORGANIC COMPOUNDS IN GROUND WATER SAMPLES

Well Number	Analysis, parts per million (ppm) NITRATE AS NITROGEN								
	1st 2/90	2nd 5/90	3rd 8/90	4th 11/90	5th 3/91	6th 6/91	7th 8/91	7-1/2 9/91	8th 11/91
MW-1	2.2	3.9	4.4	7.7		4.1			
MW-2	3.5	2.4	3.3	3.3		6			
MW-3	3.6	1.5	2.7	4.5		2.4			
MW-4	1.6	1.6	1.8	1.5		1.8			
MW-5	1.9	1.5	1.6	1.7		1.5			
MW-6	2.7	2.5	2.3	2.2		2.4			
MW-7	2.3	2.1	2.3	2.1		3.5			
MW-8	6.9	6.7	7.4	7		6.7		6.8	
MW-9	-	-	-	-		-		-	
MW-10	38.4	36.9	42.1	38.3	39	38	47	38	42
MW-11	40.6	40.5	47.8	46.5	40	46	39	48	
MW-12	49	49	56.7	50.8	50	49	51	52	52
MW-13	47	44.9	60.6	46.7	45	46	45	43	
MW-14	48.5	50.9	61	49.9	47	47	47	48	
MW-15	32.3	32.2	44.3	31	30	33	30	36	
MW-17	-	-	-	-		-			
MW-18					2.2	1.9	1.6		
MW-19							3.4	3.4	
MW-20							31	31	28
MW-21							-	-	-
MW-22							3.3	3.7	
S27-E14		7.5	9.2	5.6		12			
S29-E12		4.5	4.6	3.8		4.5			
S30-E15A		2.4	2.9	2.1		2.8			
S31-E13		4.5	4.3	3.5		4.1			
S32-E13A		4.8	4.0	4.1		3.4			
S37-E14	0.3	1.6	0.2	0.17	1.2	0.3	0.17		
S40-E14	0.18	0.2	0.2	0.23	0.18	-	0.16		
S41-E13A	1.4	1.3	1.J	1.1	0.96	1.2	0.98		
S41-E13B	0.6	0.5	0.6	0.45	0.8	0.4	0.52		
S43-E12	3.7	4.7	5.8	5.6	5.2	5.7	3.6		3.5
FF-5 #7A						8	7.7	7.7	
FF-F #8A						18	17	17	
RWF East	0.2	0.2	0.1	-	0.18	0.15	0.11		
RWF West	0.18	0.2	0.1	-	0.49	0.13	0.16		
SNP # 14		79.5						44	
SNP # 15		61.4						36	
SNP # 16		42.7						22	
SNP # 23								4.4	
SNP # 24								4.7	
SNP # 9								35	

-: Not detected
J: Estimated Value (All 4th round data are estimated values--"J" omitted from table)

Values for rounds 1-4 from Data Validation Report, Fourth Quarter Groundwater Chemical Analysis, 1100-EM-1 Operable Unit, Phase I Remedial Investigation

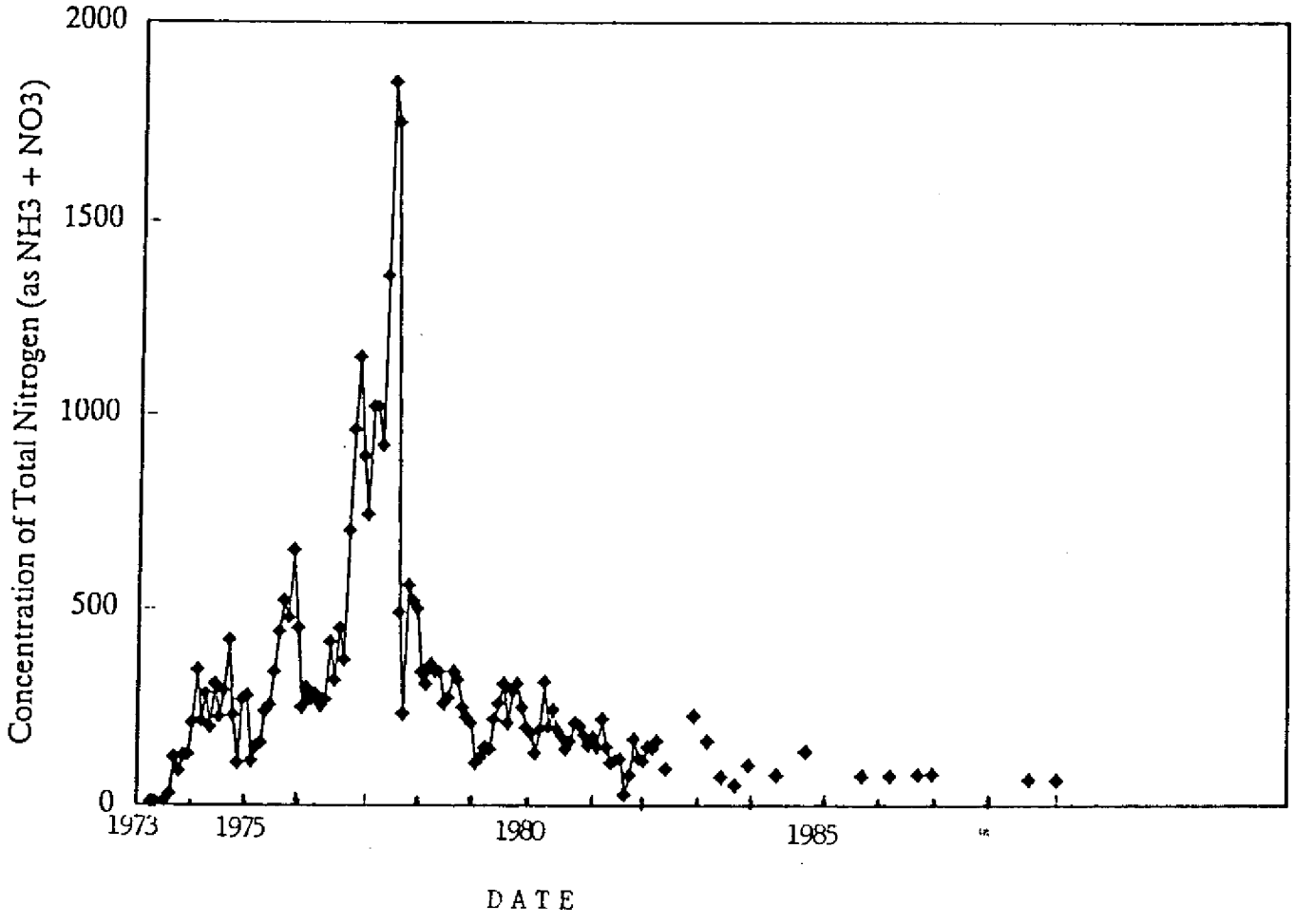
Values for rounds 6-8 are derived from "Unvalidated" Data Packages

Nitrate - Drinking Water MCL, 10 ppm

DRAFT

Concentration of Total Nitrogen at SNP.

For Test Well #2



Nitrate as Nitrogen For Siemens Test Wells 1981 to 1989

Well#	81/1	81/2	81/3	81/4	82/1	82/2	82/3	82/4	83/1	83/2	83/3	83/4	84/1	84/2	84/3	84/4	85/1	85/2	85/3	85/4	86/1	86/2	86/3	86/4	87/1	87/2	87/3	87/4	88/1	88/2	88/3	88/4	89/1	89/2	89/3	89/4
TW#1	68	79	38	27	72	63	49	81	99	81	60	52	52		53		71		64		46		42			51.3	25.6	39.6	52		54.4		46.6		38.9	
TW#2	34	65	42	18	34	37	33	39	65	57	18	6	44		43		57		69		38		43			44.7	37.7		25.8		57.5		62.5		60.8	
TW#3																										52.4										
TW#4																										25.1										
TW#9	75	75	40	37	47	64	53	56	58	67	48	11	21		86		94		75		59		68				77.9		41.8		61.8		20.3		83.1	
TW#13	2.6	3.2	2.1	1.4	2.5	3.1	1.4	0.8	3.5	4.4	1.6	1.3	2.8		2.7		10.2		5.6		5.6		3.4													
TW#14	53	77	34	21	40	37	51	65	66	68	52	41	75		64		46		49		52		49				64.3		42		46.9		56.5		63.9	
TW#15	80	65	39	22	46	61	41	31	54	51	11	39	64		53		85		49		56		33.9				59.4		58.9		38.4		64.2		63.9	
TW#16							24	13	41	0.9	1.2	1.5	1.4		1.4		1.8		1.1		1.4		1.4				2.3		1.1		1.8		5.7		2.5	

May 1992

MONDAY	
May 11 S29-E11 (MW-20) S31-E11 (MW-22) S31-E10A (MW-12)	May 18 S41-E11 (MW-1) ~~S41-E12 (MW-3)~~ S37-E11 (MW-6) S38-E12A (MW-4)
TUESDAY	
May 12 S31-E10C (MW-14) SNP-SPLIT (GM-8) S31-E10D (MW-15)	May 19
WEDNESDAY	
May 13 S31-E8 (MW-8) S30-E10B (MW-11) S30-E10A (MW-10)	May 20
THURSDAY	
May 14 S34-E10 (MW-2) S32-E11 (MW-19) S29-E12 MW-3 8:30	May 21
FRIDAY	
May 15	May 22

4/3/1992

ATTACHMENT 5

DON'T SAY IT --- Write It!

DATE: April 8, 1991

TO: Clive Francis (Siemens)

FROM: Wendell Greenwald

Telephone: 376-1252

cc: Bob Stewart DOE-RL
John Stewart USACE

SUBJECT: Data Provided To Siemens Nuclear Power Corp.

Enclosed is a package of data which DOE agreed to provide to Siemens Nuclear Power Corp. (SNP) at the Pre-Unit Manager Meeting in March. The following are being provide:

Boring Logs for wells in the 300 area (wells of interest to the investigation at SNP/Horn Rapids Landfill)

"Summaries of Well Construction Data and Field Observations for Existing 300-FF-5 Operable Unit Resource Protection Wells" which contains information on well construction

Depth to water measurements for some wells in the 300 area (single sheet of paper showing data from Dec. 1991 thru Mar. 1992,)

Coordinates of Wells at Hanford (computer disk containing data base of well survey information)

Well Status Report (9 page report showing well number, temporary well number and status information)

Information regarding pump testing being conducted in the 300 area is still being developed and will be provided to SNP when it is available. Additional depth to water information for wells in the 300 area is being developed and will be provided to SNP when it becomes available

54-3000-101 (9/59) {EF} GEF015
D.S.I.

ATTACHMENT 6

DON'T SAY IT --- *Write It!*

DATE: April 21, 1992

TO: Clive Francis Siemens

FROM: Wendell Greenwald USACE

Telephone: 509 376-1252

CC: Bob Stewart DOE/RL
John Stewart USACE

SUBJECT: Data Provided to SNP by DOE

The following data is provided to Siemens Nuclear Power Corporation as per Siemens' request at the Pre-Unit Manager Meeting in March, 1992:

Depth to water measurements for selected, older wells in the 300 area (3.5 inch disk)

Depth to water measurements for recent wells in the 300 area (3.5 inch disk)

Contaminant Degradation Study at the 1100-EM-1 Operable Unit, by Golder Ass. Inc., April 2, 1992 (three copies provided)

Data Validation Procedures for Chemical Analysis, Revision 1, WHC-SD-EN-SPP-002, April 1992

Consent Decree for Remedial Design and Remedial Action - Northwest Transformer Company (information provided by EM-24 on use of MTCA)

PNL data package for Tc-99 analysis (three copies with one copy including the raw data and QC reports)

Pump test results were to be provided to SNP in addition to the data listed above. The USACE is in the process of obtaining this data and will forward it to SNP when it becomes available.